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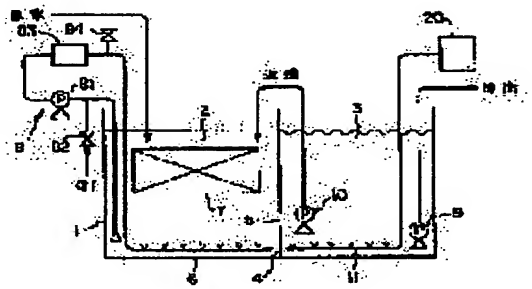
(54) TREATMENT OF WASTE WATER TO BE DISCHARGED IN SEWERAGE

(57)Abstract:
PROBLEM TO BE SOLVED: To efficiently treat a waste water to be directly discharged in sewerage in accordance with the properties of the water without need for any process or equipment like the conventional activated-sludge treatment and with an extremely simple structure.
SOLUTION: A treating tank 1 into which raw water is injected is separated by a partition 4 with a water passage 5 formed at the intermediate part positioned at a specified distance from the tank bottom and water surface into a primary treating part 2 and a secondary treating part 3. In the primary treating part 2, a superfine bubble is blown up from the lower part, hence the grease and grease decomposing bacteria are floated up and retained, the retained grease is decomposed by the bacteria, and the treated water at the intermediate part of the primary treating part 2 is introduced into the secondary treating part 3 through the water passage 5 of the partition 4. In the secondary treating part 3, the primarily treated water is agitated, one part of the treated water is returned to the treating tank 1, and the other part is discharged from the tank bottom.



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* NOTICES *

CLAIMS

[Claim(s)]
[Claim 1] The processing tub which pours in raw water with the batch object with which a headrace is formed in the pars intermedia in which it has predetermined distance and is located from the both sides of the bottom of the tank section and the water surface Making a fat-splitting bacillus decompose a part for the fats and oils which divided into the primary treatment section and the secondary treatment section, and a part for fats and oils and the fat-splitting bacillus of raw water were made to go up and pile up by overly pressuring upwards detailed air bubbles from a lower part in said primary treatment section, and piled up While making the part return said processing tub, making the primary treatment water which the treated water of the pars intermedia of the primary treatment section was made to conduct water to said secondary treatment section through the headrace of said batch object, and conducted water in this secondary treatment section stir The waste-water-treatment approach for sewerage tail water characterized by making other parts discharge from the bottom of the tank section.

[Translation done.]

* NOTICES *

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2.**** shows the word which can not be translated.
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DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Field of the Invention] This invention relates to the waste-water-treatment technique of a facility in which wastewater is directly discharged to sewerage.
[0002]
[Description of the Prior Art] Although current, a restaurant, wastewater of a food-processing factory, etc. are directly discharged to sewerage, regulation of pH, BOD, SS, N-Hex, etc. is prepared also about those wastewater. For example, if a displacement is more than a 50m3/day in the case of Tokyo, since the standard made into pH:5-9, less than [BOD:600 mg/l], less than [SS:600 mg/l], and less than [N-Hex:30 mg/l] will be established, the waste water treatment which fulfills the standard is needed in those facilities.
[0003] And as such a waste-water-treatment approach, the activated-sludge-treatment approach is adopted widely. if drawing 4 is the typical equipment configuration and it explains based on it -- first -- the raw water behind a screen -- pretreatment -- carrying out -- an oily water separation tub (with no illustration) -- pouring in -- there -- a neutralizer and a flocculant -- adding -- a suspended solid -- condensation flocculation -- carrying out -- air bubbles -- pressuring upwards -- a suspended solid is raised, and while scratching the Society for Cutting Up Men continuously and discarding it, remainder raw water is poured into an equalizing tank 12. Raw water is poured into an aerator 13 from an equalizing tank 12, and active sludge is made by carrying out long duration aeration there. Within the aerator 13, while the organic substance adheres to the surroundings of active sludge, the aerobic bacterium decomposes it by aeration and active sludge increases, the organic substance in liquid decreases in number. Next, the liquid is poured into the precipitate separation tub 14, the active sludge and supernatant liquor which are deposited on the lower part there are separated, and supernatant liquor is discharged. Although some active sludge is returned to an aerator as returned sludge, the remainder is discarded after processing as excess sludge.
[0004]
[Problem(s) to be Solved by the Invention] By the way, when the pollutants before processings (especially a food-processing factory, a restaurant, a large dining-room, etc.) of the wastewater directly discharged to sewerage were investigated, about BOD or SS, the case below a standard value is most, and it turned out that only a N-Hex value far exceeds a standard.
[0005] On the other hand, said activated-sludge-treatment method is processing which sets a chief aim to reduction of BOD or SS, and removal for fats and oils is chiefly performed by condensation / pressurization separation processing of the head end process which is not shown even in drawing 4 . Although amelioration has been performed recently, the activated-sludge-treatment approach and fundamentally As there being a problem control of processing being difficult since it is the method which carries out precipitate separation of the active sludge, and the facility which it takes are shown in drawing 4 And the process is also complicated. [an equalizing tank, an aerator, a setting tank, a sludge disposal, an abandonment facility, etc.] Installation cost and operation cost will also say seriously that it is not appropriate to perform activated sludge treatment from this thing as waste water treatment of the facility which discharges wastewater to sewerage directly the top which needs processing, removal, etc. of excess sludge especially.
[0006] Then, performing waste water treatment only by condensation / pressurization separation processing of a head end process is also considered to such a problem. However, the activity and facility which dehydrate it besides **** or discard further the extra jacket activity and reservoir activity of condensation flocks which selection and tuning of the neutralizer used for condensation and a flocculant were complicated, and needed to

set the special person in charge, and surfaced only by this approach are needed.
[0007] On the other hand, there is an art called a grease trap as high-concentration removal processing for fats and oils. A part for fats and oils is made to deposit on a processing tub, and this scratches it and discards it. However, this approach is a simple approach used when a displacement is the facility of under a 50m3/day, cannot remove a part for fats and oils completely too much simple-wise therefore, but requires the extra jacket, abandonment activity, and facility for fats and oils still like removal of the excess sludge in the activated-sludge-treatment approach.
[0008] It was not originated in view of the above problems of the conventional technique, and this invention does not tend to require any process and facility like the conventional activated-sludge-treatment approach, but tends to offer the waste-water-treatment approach that said wastewater can be efficiently processed with a very simple configuration, according to the property of the wastewater directly discharged to sewerage.
[0009]
[Means for Solving the Problem] As mentioned above, the facility which the activated-sludge-treatment approach takes is comparatively large-scale. However, such an approach is adopted widely not only in large-scale facilities, such as a public sewage treatment facility, but in facilities, such as a food-processing factory which discharges wastewater to sewerage directly, and a restaurant, a large dining-room.
[0010] For this reason, so that this invention persons may consider whether it is adopting the activated-sludge-treatment approach also in many facilities which discharge wastewater to sewerage directly When the pollutants before processings (especially a food-processing factory, a restaurant, a large dining-room, etc.) of the wastewater first discharged to sewerage directly are investigated, about BOD or SS, the case below a standard value is most. Only the N-Hex value was found by far exceeding a standard (it is clear also from the table 2 showing the sample component of the example of the 2nd trial mentioned later).
[0011] This shows that the fats-and-oils part processing under wastewater is important in such many facilities. On the other hand, said activated-sludge-treatment approach is not an art not much efficient about removal for fats and oils.
[0012] It stands on such a standpoint. Then, this invention persons While making it the processing tub structure where do not use sludge, and sludge is hardly used as a result of examining and studying wholeheartedly the processing technique in which a part for the fats and oils under wastewater can be efficiently processed by the simpler approach By overly using detailed air bubbles effectively with a fat-splitting bacillus in the structure, it comes to originate this invention which can remove a part for fats and oils very simply and effectively.
[0013] For this reason, the waste-water-treatment approach for sewerage tail water concerning this invention The processing tub which pours in raw water with the batch object with which a headrace is formed in the pars intermedia in which it has predetermined distance and is located from the both sides of the bottom of the tank section and the water surface Making a fat-splitting bacillus decompose a part for the fats and oils which divided into the primary treatment section and the secondary treatment section, and a part for fats and oils and the fat-splitting bacillus of raw water were made to go up and pile up by overly pressuring upwards detailed air bubbles from a lower part in said primary treatment section, and piled up While making the part return said processing tub, making the primary treatment water which the treated water of the pars intermedia of the primary treatment section was made to conduct water to said secondary treatment section through the headrace of said batch object, and conducted water in this secondary treatment section stir, it is characterized by making other parts discharge from the bottom of the tank section.
[0014] Although the mode which makes air blow off from a powder trachea with the super-micropore allotted to the bottom of the tank section here in Blois as a mode which overly pressures upwards detailed air bubbles is considered first If it considers as the mode which makes the pressurization air water which mixed air to raw water and was used as it under high pressure blow off from the bottom of the tank section Since it blows off in the bottom of the tank section from which pressurization air water will be in a reduced pressure condition at a stretch, it becomes a micron unit, and the air bubbles make the rise effectiveness and decomposition effectiveness for fats and oils demonstrated to the maximum extent, and serve as a more desirable mode. Moreover, in order to spray air in Blois and overly to make detailed air bubbles, it is necessary to make super-micropore form in a powder trachea but, and when blinding etc. arises in the super-micropore, the repair activity must be done within a processing tub. On the other hand, in the mode using pressurization air water, since detailed air bubbles overly arise only by making it blow off from the processing bottom of the tank section, it has the merit that the time and effort which about [that it is not necessary to form super-micropore in a powder trachea] and its repair activity takes can be saved.

[0015] Next, an operation of this invention is explained. The raw water after filtration is first poured into the primary treatment section of a processing tub on a screen. In the primary treatment section, detailed air bubbles are overly pressured upwards from a lower part. this -- the amount of [in raw water] fats and oils overly go up with detailed air bubbles. Although a fat-splitting bacillus is continuously poured into the primary treatment section, contact material may be arranged to the pars intermedia, and a fat-splitting bacillus may be made to adhere there. while a fat-splitting bacillus increases in contact material with the configuration with which this contact material is arranged -- super- -- detailed air bubbles -- pressuring upwards -- some fat-splitting bacilli will go up together with a part for fats and oils, and it can process efficiently.
[0016] Near the water surface of the primary treatment section, a part for the fats and oils which went up is decomposed by the fat-splitting bacillus. Since the air bubbles pressured upwards especially are overly detailed, the decomposition effectiveness for fats and oils can overly demonstrate them according to a decomposition promotion operation of detailed air bubbles to the maximum extent, a part for fats and oils and a fat-splitting bacillus piling up on the water surface.
[0017] On the other hand, the headrace is formed in the pars intermedia of a batch object, and the treated water of the primary treatment section conducts water to the secondary treatment section through the headrace. The following operations are especially accepted from this headrace being formed in the pars intermedia in which it has predetermined distance and is located from the both sides of the bottom of the tank section and the water surface. First, the sludge deposited on the pars basilaris ossis occipitalis of the primary treatment section will not flow into the secondary treatment section as it is by having predetermined distance from the bottom of the tank section. The same complicated processing as removal of excess sludge [in / after all / although it is satisfactory even if it discharges as it is about sludge since a sludge content also has little wastewater which is directly discharged to target sewerage / this invention /, supposing all the sludge of the primary treatment section flows into the secondary treatment section, in the secondary treatment section, the alimentation of sludge will increase remarkably, and become high concentration, and it becomes impossible to discharge it as it is, and / the activated-sludge-treatment approach] is needed. That is, when the headrace has predetermined distance from the bottom of the tank section, it becomes that to which the treated water of the sludge concentration of optimum dose flows in the secondary treatment section, and therefore, it can always discharge in the secondary treatment section, with sludge not processed. In addition, since it will flow into the secondary treatment section and alimentation will become below constant value whenever the alimentation reaches to a headrace although sludge accumulates on the pars basilaris ossis occipitalis of the primary treatment section, by the time it removes it, it will not result.
[0018] Next, when the headrace has predetermined distance from the water surface, the fat-splitting operation currently performed near the water surface of the primary treatment section is secured. That is, although a part for fats and oils and its decomposition bacillus overly go up with detailed air bubbles and an efficient decomposition reaction is overly performed in the stagnation operation by detailed air bubbles near the water surface of the primary treatment section, when the headrace has predetermined distance from the water surface, near the water surface, by closing with a batch object, prevented that the treated water under decomposition reaction flowed into the secondary treatment section, the stagnation operation was made to ensure, and the fat-splitting operation is secured.
[0019] Aeration stirring of the treated water which conducted water to the secondary treatment section is carried out there. Since the fat-splitting bacillus is mixing into treated water, a decomposition reaction arises. The part is returned to said primary treatment section, and makes decomposition processing perform again there. by this repeat, the decomposition effectiveness for fats and oils is boiled markedly, and is raised.
[0020] Discharge of the treated water from the secondary treatment section is performed from the bottom of the tank section. Since the sludge concentration of treated water serves as optimum dose according to an operation of an above-mentioned headrace and removal of the deposited sludge is [sludge accumulates on the bottom of the tank section and] needed supposing it discharges from the tub upper part satisfactory about sludge even if it discharges by the concentration, this shall have been discharged while sludge had been included from the bottom of the tank section. That is, it not only does not use sludge, but there has been nothing **** entirely about a sludge disposal by the formation configuration of said headrace, and the discharge configuration from the bottom of the tank section, using only a fat-splitting operation of a fat-splitting bacillus at this invention.
[0021]
[Embodiment of the Invention] The gestalt of operation concerning this invention is explained based on a

drawing. In addition, this invention is not limited to the following gestalten at all.
[0022] Drawing 1 is the schematic diagram having shown an example of the processing facility which can apply this invention, and, as for a detailed air-bubbles listing device, and 9 and 10, for the powder trachea for detailed air bubbles, and 7, contact material and 8 are [the dashboard the secondary treatment section and whose 4 a processing tub and 2 are / for one / batch objects as for the primary treatment section and 3, and 5 / a headrace and 6 / overly / a pump and 11] overly the powder tracheae for big and rough air bubbles among drawing. In addition, the raw water poured into the processing tub 1 shall already be filtered on the network-like screen (2-5mm of meshes).
[0023] The processing tub 1 can divert enough the aerator which was good, for example, was conventionally used by the activated-sludge-treatment method in any configurations and magnitude to some other purpose, if the powder tracheae 6 and 11 can be arranged at the pars basilaris ossis occipitalis.
[0024] In the center section, a dashboard 4 is arranged and the processing tub 1 is divided into the primary treatment section 2 and the secondary treatment section 3 for the processing tub 1 by this dashboard 4.
[0025] While introductory tubing with which raw water is poured into the upper part of the primary treatment section 2 is arranged, the contact material 7 is arranged for the powder trachea 6 in the upper part of this powder trachea 6 again at the bottom of the tank section, respectively.
[0026] The gap where a dashboard 4 serves as a headrace 5 is formed, and the formation location of the gap serves as pars intermedia which has predetermined distance from the both sides of the bottom of the tank section and the water surface.
[0027] The powder trachea 6 is tubing which the pressurization air water from the detailed air-bubbles listing device 8 is made overly to sprinkle. The detailed air-bubbles listing device 8 consists of the pump 81 for raw water, the air ** ON bulb 82, a pressure tank 83, and a ****** bulb 84, from a bulb 82, it takes in air to the raw water pumped up from the processing tub 1 with the pump 81, mixes it, makes air mixed water pressurize within a pressure tank 83 by the pump 81 and the bulb 84, and overly creates pressurization air water. if it lets this pressurization air water pass to said powder trachea 6, since it will be in a reduced pressure condition at a stretch within the processing tub 1 -- the mixed air of pressurization air water -- a micron unit -- it overly becomes detailed air bubbles and will go up. In addition, as other configurations of the detailed air-bubbles listing device 8, it is overly possible to make it make only air blow off from the powder trachea 6 in Blois. However, it is necessary to form the hole of the powder trachea 6 in super-****, and the thing which comes to wrap entirely the rubber expanded if it considered as the configuration to the perimeter of tubing with a hole can be considered in the mode.
[0028] The contact material 7 is a location which makes a fat-splitting bacillus adhere there and carries out culture growth, and the quality of the material which was suitable for culture of a bacillus for this reason, for example, ceramic material, its pumice, granite, etc. are desirable. Moreover, it is easy to be well-known [the fat-splitting bacillus to be used].
[0029] While the pump 10 for return is arranged at the lower part, as for the secondary treatment section 3, the pump 9 for discharge and the powder trachea 11 are arranged at the bottom of the tank section.
[0030] Unlike the powder trachea 6 of the primary treatment section 2, the powder trachea 11 of the secondary treatment section 3 consists of tubing with the hole of a large number which pass big and rough air bubbles, and is connected to Blois 20 through the communicating tube. The air bubbles pressured upwards from this powder trachea 11 become big and rough, and will fully stir the treated water in the secondary treatment section 3.
[0031] The processing in the above simple facility configurations is explained below.
[0032] while throwing in a fat-splitting bacillus continuously in the primary treatment section 2 into which raw water is poured -- super- -- the detailed air-bubbles listing device 8 to pressurization air water -- the powder trachea 6 -- the very small hole of delivery and the powder trachea 6 -- a micron unit -- it is made for detailed air bubbles overly to blow up a part for the fats and oils in raw water -- the -- it will overly go up efficiently with detailed air bubbles. Moreover, although detailed air bubbles also pass the contact material 7, they overly look like [detailed air bubbles] some fat-splitting bacilli which the fat-splitting bacillus of optimum dose is made to adhere to the contact material 7 beforehand, and are increased there for this reason, and overly go up more. Although a part for fats and oils and a fat-splitting bacillus go up to the water surface of the primary treatment section 2, since [of a micron unit] it is overly detailed, as for both, the air bubbles going up will pile up near the water surface. this -- near the water surface, decomposition for fats and oils is overly conjointly performed for a stagnation operation of detailed air bubbles and a decomposition promotion operation efficiently.
[0033] The treated water of the primary treatment section 2 conducts water to the secondary treatment section

3 through the headrace 5 of a dashboard 4. First, the sludge deposited on the pars basilaris ossis occipitalis of the primary treatment section 2 does not flow into the secondary treatment section 3 as it is, but to the height of a headrace 5, it is begun to deposit this headrace 5 and it flows out of being formed in the pars intermedia in which it has predetermined distance and is located from the both sides of the bottom of the tank section and the water surface. Therefore, sludge concentration always serves as optimum dose, and will flow into the secondary treatment section 3. In the bottom of the tank section of the primary treatment section 2, although sludge accumulates, since it will flow out with treated water as mentioned above if the height of a headrace 5 becomes more than it, it is unnecessary. [of the processing which does not say that deposits in high concentration and carries out sludge removal] Next, prevent that the treated water under decomposition reaction flows into the secondary treatment section 3, the stagnation operation by detailed air bubbles is made overly to ensure, and the fat-splitting operation is made to secure by closing by the dashboard 4 near the water surface, when the headrace 5 has predetermined distance also from the water surface.

[0034] in the secondary treatment section 3, big and rough air bubbles pressure upwards from the powder trachea 11 -- having -- **** -- this -- pressuring upwards -- the treated water which conducted water is stirred. The fat-splitting bacillus is also contained in treated water from the primary treatment section 2, and, for this reason, decomposition for fats and oils is promoted more by stirring by big and rough air bubbles. Furthermore, stirring water is returned to the primary treatment section 2 through return tubing with a pump 10, and decomposition processing for fats and oils is again performed within the primary treatment section 2. After performing such processing, treated water is pumped up from the bottom of the tank section of the secondary treatment section 3 with a pump 9, and sewerage is stocked. Since the sludge concentration of treated water serves as optimum dose according to an operation of said headrace 5, even if it discharges it about discharging the treated water of the bottom of the tank section, it prevents sludge accumulating on the bottom of the tank section of the secondary treatment section 3, and it is not only satisfactory, but does the complicated sludge removal activity unnecessary.

[0035] thus , with this operation gestalt , since sludge concentration be maintain low and sludge be make to deposit on the bottom of the tank section beyond a need , it be the thing into which a part for the fats and oils in a raw water can be make to decompose efficiently with the very simple facility configuration which do not require any sludge disposal , and as show in the example mention later , it have apply to waste water treatment regulation of a facility which spray water on wastewater directly in sewerage enough .

[0036]

[Example] In the facility configuration of said operation gestalt, wastewater was examined with the following facility specifications.

Processing tub: 3, pressure tank:3-7kg/cm2G, Blois:2.2m3/min, pump:150 l/min, and the standard of treated water made the following guarantee water quality the standard 150m.

pH : 5 - 9BOD : 600 or less mg/ISS : Quality of a 600 or less mg/IN-Hex extract : 30 or less mg/l [0037] O The example of the 1st trial : the kitchen wastewater extracted from the grease-trap tub (it is sunk and deposited on a pars basilaris ossis occipitalis with the water tank for oily water separation after oil surfaces on the top face) attached to a dining-room facility including oil was used. Water quality is pH:6.9, COD:7800 mg/l, and nature:of N-Hex extract40300mg/l. (the usual kitchen wastewater 100 - 200 mg/l), and diluted and adjusted this about 100 times (quality of a N-Hex extract: 400 mg/l). 0.035 g/l and a mycotrophy agent were 0.3 g/l about what the addition of a fat-splitting bacillus to the processing tub 1 becomes from pharmaceutical preparation. It processed by pouring 20l. of said adjusted test samples into such a processing tub 1. This test result is shown in Table 1 (only a N-Hex value is shown in the graph of drawing 2). In addition, the unit in Table 1 is mg/l except [all] pH.

[0038]

[Table 1]

経過時間	DO	pH (28℃)	N－Hex抽出物質
0時間後	－	8.0	415
6時間後	6.9	7.0	253
12時間後	7.5	7.0	31
24時間後	8.0	7.0	8
48時間後	8.0	7.0	3

[0039] The N-Hex value became almost comparable as the permission maximum standard value after 12-hour progress, and it became a permissible standard value (Tokyo) within 24 hours so that more clearly than the above-mentioned table 1. As for after 48-hour progress, 3 mg/l and the concentration of those decreased extremely.

[0040] O The example of the 2nd trial : what mixed each wastewater of the restaurant in a department store in Tokyo Oimachi and a personnel dining-room by the ratio of 7:3 was used as a sample. Water quality is as in Table 2. Among the water quality of Table 2, since the value was low, only the pH value was adjusted to 7.1. 0.035 g/l and a mycotrophy agent were 0.3 g/l about what the addition of a fat-splitting bacillus to the processing tub 1 becomes from pharmaceutical preparation. It processed by pouring 20l. of said adjusted test samples into such a processing tub 1. This test result is shown in Table 3 (only a N-Hex value is shown in the graph of drawing 3). In addition, the unit in Table 2 and 3 is mg/l except [all] pH.

[0041]

[Table 2]

	レストラン	社員食堂	混合排水（試料）
pH	6.4	5.9	6.2（実測値）
SS	160	260	190（計算値）
BOD	430	570	472（計算値）
N-Hex抽出物質	47	97	62（計算値）

[0042]

[Table 3]

経過時間	１２時間	２４時間
ｐＨ	7.0	6.8
ＳＳ	215	220
ＢＯＤ	495	470
Ｎ-Hex抽出物質	27	4

[0043] The N-Hex value became in the permissible standard value (Tokyo) after 12-hour progress, and 4 mg/l and the concentration of those decreased extremely after 24-hour progress so that more clearly than the above-mentioned table 3. In addition, although it was more sharply [still / than standard value 600 mg/l] low although it exceeded a little than the numeric value of the beginning [value / BOD / after / 12 hour progress], and SS value also rose a little after 24-hour progress, it is what also has this sharply lower than standard value 600 mg/l.

[0044] Moreover, six days of arbitration are chosen for the trial of the same conditions in within the period on May 30, Heisei 7 to September 29. As a result of investigating the N-Hex value of the raw water and treated water in 12:00 p.m. of the selected day, a maximum of 85% (June 29), the minimum is also 45% (May 30) and, as for the N-Hex value elimination factor, about 72% and a very effective elimination factor were accepted on the average.

[0045]

[Effect of the Invention] As explained above, according to the waste-water-treatment approach for sewerage tail water concerning this invention, the optimal processing for the property of the wastewater for sewerage tail water which is beyond a standard value by fats and oils can carry out by the very simple equipment configuration.

[0046] That is, the following effectiveness is acquired.

** Since it is sufficient for the facility which processing takes if the inside of the processing tub of 1 is fundamentally divided into two Even if it is not necessary to arrange much configurations, such as an equalizing tank, an aerator, a setting tank, a sludge disposal, and an abandonment facility, and and compares with condensation / pressurization separation processing of the head end process like the conventional activated-sludge-treatment approach The activity and facility which dehydrate the extra jacket activity and reservoir activity of Society for Cutting Up Men which did not need to set the special person in charge for selection of the neutralizer used for condensation and a flocculant or tuning, and surfaced, and it, or are discarded further are also unnecessary. that is, by this invention method, compared with the conventional approach, a very simple equipment configuration is sufficient, and for this reason, installation and operation cost are also boiled markedly and are decreasing (if it estimates on a scale of the same, facility cost will be conjectured that 1/4 and operation cost decrease about by 1/7).

** Like the activated-sludge-treatment approach also as a process, don't need many processings, but especially, complicated sludge disposals (adjustment of the amount of sludge, processing, removal of excess sludge, etc.) are unnecessary entirely, and the maintenance of a facility is also easy.

** According to the process which can overly pressure upwards detailed air bubbles, the amount of fats and oils are made to go up and pile up near the water surface, and thereby, since it is what promotes a decomposition reaction with a fat-splitting bacillus near the water surface, improvement in the processing effectiveness is performed notably. Therefore, it is the optimal art for processing of the wastewater for sewerage tail water which is beyond a standard value by fats and oils.

** even if it compares with the grease-trap processing which was the conventional primary treatment method, of course, since it becomes a configuration unnecessary the extra jacket, abandonment activity, and facility which it takes and simple and a part for fats and oils is decomposed and removed by this invention unlike moreover only

removing a part for fats and oils by the oily water separation tub, boil fats-and-oils part reduction effectiveness markedly, and it improves.
** It also has the merit that it can also perform easily diverting the aerator which the installation is also easy an aerator and was being used conventionally, and a setting tank to some other purpose again since it is sufficient, if detailed air bubbles overly pressure upwards and a means and a stirring means are established in a processing tub while arranging a predetermined batch object fundamentally.

[Translation done.]

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DESCRIPTION OF DRAWINGS

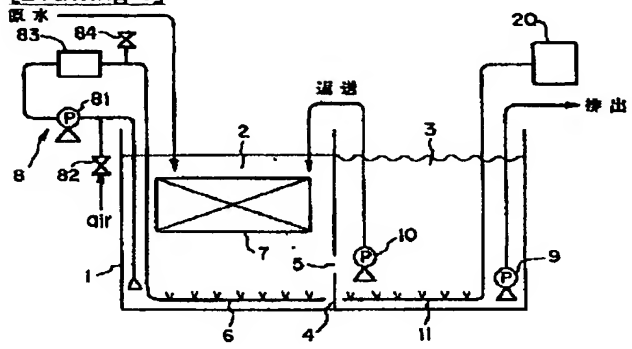
[Brief Description of the Drawings]
[Drawing 1] It is the explanatory view having shown the outline of the processing facility concerning the operation gestalt of this invention.
[Drawing 2] It is the graph which showed transition of the nature value of a N-Hex extract of the example of the 1st trial.
[Drawing 3] It is the graph which showed transition of the nature value of a N-Hex extract of the example of the 2nd trial.
[Drawing 4] It is the explanatory view having shown the outline of the processing facility which the activated-sludge-treatment approach takes.
[Description of Notations]
1 Processing Tub
2 Primary Treatment Section
3 Secondary Treatment Section
4 Dashboard
5 Headrace
6 It is Overly Powder Trachea for Detailed Air Bubbles.
8 It is Overly Detailed Air-Bubbles Listing Device.
11 Powder Trachea for Big and Rough Air Bubbles

[Translation done.]

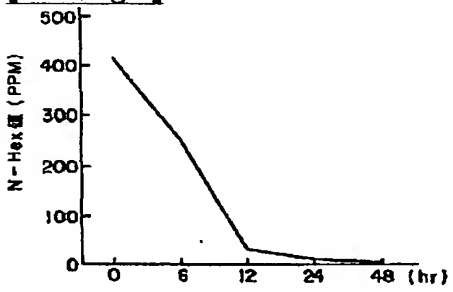
* NOTICES *

DRAWINGS

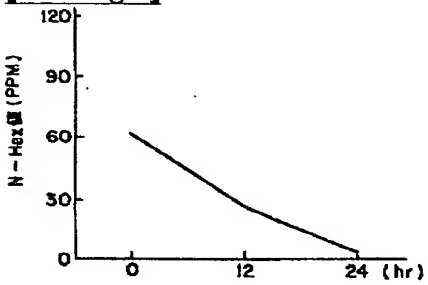
[Drawing 1]



[Drawing 2]



[Drawing 3]



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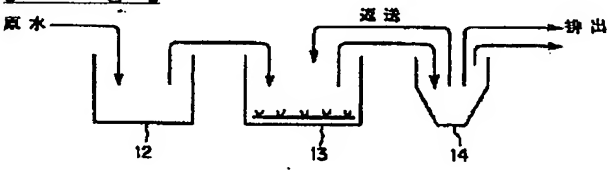

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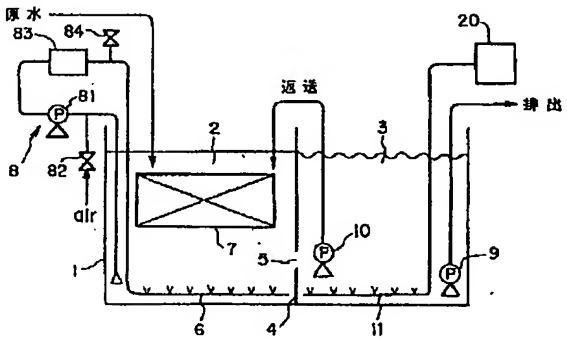
(54)【発明の名称】　下水道放水用排水処理方法

(57)【要約】

【課題】　従来の活性汚泥処理方法のような工程及び設備を一切要せず、下水道に直接放流される排水の性質に合わせて、極めて簡易な構成で前記排水の処理を効率的に行う。

【解決手段】　原水を注入する処理槽１を、槽底部及び水面の双方から所定距離を有して位置する中間部に導水路５が形成される仕切体４により、一次処理部２と二次処理部３とに分ける。前記一次処理部２において、超微細気泡を下方から吹き上げることにより原水の油脂分及び油脂分解菌を上昇かつ滞留させ、滞留した油脂分を油脂分解菌で分解させつつ、一次処理部２の中間部の処理水を前記仕切体４の導水路５を介して前記二次処理部３に導水させ、該二次処理部３において、導水した一次処理水を撹拌させつつその一部を前記処理槽１に返送させるとともに、他の一部を槽底部から排出させる。



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【特許請求の範囲】

【請求項１】　原水を注入する処理槽を、槽底部及び水面の双方から所定距離を有して位置する中間部に導水路が形成される仕切体により、一次処理部と二次処理部とに分け、前記一次処理部において、超微細気泡を下方から吹き上げることにより原水の油脂分及び油脂分解菌を上昇かつ滞留させ、滞留した油脂分を油脂分解菌で分解させつつ、一次処理部の中間部の処理水を前記仕切体の導水路を介して前記二次処理部に導水させ、該二次処理部において、導水した一次処理水を撹拌させつつその一部を前記処理槽に返送させるとともに、他の一部を槽底部から排出させることを特徴とする下水道放水用排水処理方法。

【発明の詳細な説明】

【０００１】

【発明の属する技術分野】この発明は、下水道に排水を直接放流するような施設の排水処理技術に関する。

【０００２】

【従来の技術】現在、レストランや食品加工工場の排水などは下水道に直接放流されるが、それらの排水に関しても、ｐＨ，ＢＯＤ，ＳＳ，Ｎ－Hex等の規制が設けられている。例えば、東京都の場合、排水量が50m³/日以上であれば、ｐＨ：５～９，ＢＯＤ：600mg/l以下，ＳＳ：600mg/l以下，Ｎ－Hex：30mg/l以下とする規準が設けられるため、それらの施設ではその規準を満たす排水処理が必要となる。

【０００３】そして、そのような排水処理方法としては、活性汚泥処理方法が広く採用されている。図４はその代表的な装置構成であり、それに基づき説明すると、まずスクリーン後の原水を前処理として油水分離槽（図示なし）に注入し、そこに中和剤、凝集剤を添加して懸濁物質を凝集フロック化し、気泡の吹き上げにより懸濁物質を上昇させ、そのスカムを連続的に掻き取って廃棄するとともに残部原水を調整槽12に注入する。調整槽12から曝気槽13に原水を注入し、そこで長時間曝気することによって活性汚泥を作る。曝気槽13内では活性汚泥の周りに有機物が付着し、それを曝気によって好気性細菌が分解していき、活性汚泥が増加するとともに、液中の有機物が減少していく。次に、その液を沈殿分離槽14に注入し、そこで下部に堆積する活性汚泥と上澄液とが分離され、上澄液が放流される。活性汚泥の一部は返送汚泥として曝気槽に戻されるが、残部は余剰汚泥として処理した後廃棄される。

【０００４】

【発明が解決しようとする課題】ところで、下水道に直接放流される排水（特に食品加工工場やレストラン、大食堂等）の処理前の汚濁物質を調べると、ＢＯＤやＳＳについては規準値以下の場合が殆どで、Ｎ－Hex値のみ規準を大幅に上回ることが分かった。

【０００５】一方、前記活性汚泥処理法はＢＯＤやＳＳの減少に主眼をおく処理であり、油脂分の除去は専ら、図４にすら示されない前処理工程の凝集・加圧分離処理で行われるものである。そして、活性汚泥処理方法は近時改良が施されてきているものの、基本的には、活性汚泥を沈殿分離する方式であるので処理のコントロールが困難という問題があること、またそれに要する施設は図４に示すように、調整槽、曝気槽、沈殿槽、汚泥処理・廃棄設備等多数あってその工程も煩雑であり、特に余剰汚泥の処理・除去等も必要なうえ、設置コストや稼動コストも多大にかかることから、下水道に排水を直接放流する施設の排水処理として、活性汚泥処理を行うのは適当なものでないということになる。

【０００６】そこでこのような問題に対し、前処理工程の凝集・加圧分離処理のみで排水処理を行うことも考えられる。しかし、この方法のみによっても、凝集に用いる中和剤、凝集剤の選定や調整作業が複雑で専門担当者をおく必要があり、また浮上した凝集フロックの掻取作業及び貯留作業を要するほか、それを脱水したりさらに廃棄する作業及び設備が必要となる。

【０００７】他方、高濃度の油脂分の除去処理としてグリーストラップと呼ばれる処理方法がある。これは処理槽に油脂分を堆積させそれを掻き取って廃棄するというものである。しかし、この処理法は排水量が50m³/日未満の施設の場合に用いられる簡易的な処理法であり、あまりにも簡易的がゆえに完全に油脂分を除去できず、さらに活性汚泥処理方法における余剰汚泥の除去作業と同様に、油脂分の掻取・廃棄作業及び設備を要する。

【０００８】この発明は従来技術の以上のような問題に鑑み創案されたもので、従来の活性汚泥処理方法のような工程及び設備を一切要せず、下水道に直接放流される排水の性質に合わせて、極めて簡易な構成で前記排水の処理を効率的に行い得る排水処理方法を提供しようとするものである。

【０００９】

【課題を解決するための手段】上述のように、活性汚泥処理方法に要する施設等は比較的大規模である。ところが、このような方法は、公共下水道処理施設などの大規模な施設だけでなく、下水道に排水を直接放流するような食品加工工場やレストラン、大食堂等の施設でも広く採用されているのである。

【００１０】このため、本発明者らは、下水道に排水を直接放流するような諸施設においても活性汚泥処理方法を採用する必要があるのか否かを検討するべく、まず下水道に直接放流される排水（特に食品加工工場やレストラン、大食堂等）の処理前の汚濁物質を調べると、ＢＯＤやＳＳについては規準値以下の場合が殆どで、Ｎ－Hex値のみ規準を大幅に上回ることが分かった（後述する第２試験例の試料成分を示す表２からも明らかである）。

【００１１】このことは、このような諸施設では排水中

の油脂分処理が重要であることを示すものである。一方、前記活性汚泥処理方法は油脂分の除去についてはあまり効率的な処理方法ではない。

【００１２】そこでこのような見地に立ち、本発明者らは、汚泥を利用せず、より簡易な方法で、排水中の油脂分を効率的に処理できる処理技術を鋭意検討・研究した結果、汚泥をほとんど利用しない処理槽構造にするとともに、その構造において油脂分解菌と超微細気泡とを有効に利用することにより、極めて簡易にかつ有効に油脂分が除去できる本発明を創案するに至ったものである。

【００１３】このため、本発明に係る下水道放水用排水処理方法は、原水を注入する処理槽を、槽底部及び水面の双方から所定距離を有して位置する中間部に導水路が形成される仕切体により、一次処理部と二次処理部とに分け、前記一次処理部において、超微細気泡を下方から吹き上げることにより原水の油脂分及び油脂分解菌を上昇かつ滞留させ、滞留した油脂分を油脂分解菌で分解させつつ、一次処理部の中間部の処理水を前記仕切体の導水路を介して前記二次処理部に導水させ、該二次処理部において、導水した一次処理水を撹拌させつつその一部を前記処理槽に返送させるとともに、他の一部を槽底部から排出させることを特徴とする。

【００１４】ここで、超微細気泡を吹き上げる態様としては、ブロアでエアを槽底部に配した超微細孔を有した散気管から吹き出させる態様等がまず考えられるが、原水にエアを混合して高圧下した加圧空気水を槽底部から吹き出させる態様とすれば、加圧空気水が一気に減圧状態となる槽底部で吹き出されるためその気泡がミクロン単位となって油脂分の上昇効率及び分解効率を最大限に発揮させることになり、より好ましい態様となる。またブロアでエアを吹き付けて超微細気泡を作り出すためには、散気管に超微細孔を形成させる必要があるが、その超微細孔に目詰まり等が生じた際はその補修作業は処理槽内で行わざるを得ない。これに対し、加圧空気水を利用する態様では、それを処理槽底部から吹き出させるだけで超微細気泡が生じるため、散気管に超微細孔を形成する必要がないばかりか、その補修作業に要する手間が省けるというメリットを有している。

【００１５】次に本発明の作用を説明する。まず処理槽の一次処理部に、スクリーンで濾過後の原水を注入する。一次処理部では、超微細気泡が下方から吹き上げられる。この超微細気泡により原水中の油脂分は上昇する。一次処理部には連続的に油脂分解菌を注入するが、その中間部に接触材を配置し、そこに油脂分解菌を付着させてもよい。この接触材が配置されている構成では、接触材中で油脂分解菌が増殖するとともに、超微細気泡の吹き上げにより油脂分と一緒に一部の油脂分解菌が上昇することになり、効率よく処理を行える。

【００１６】一次処理部の水面近くでは、上昇した油脂分が油脂分解菌により分解される。特に吹き上げられる

気泡が超微細であるため、油脂分及び油脂分解菌は水面上で滞留しつつ、超微細気泡の分解促進作用によって、油脂分の分解効率が最大限に発揮できるものとなる。

【００１７】一方、仕切体の中間部には導水路が形成されており、その導水路を介して一次処理部の処理水は二次処理部へと導水する。この導水路は、槽底部及び水面の双方から所定距離を有して位置する中間部に形成されていることから、特に次のような作用が認められる。まず、槽底部から所定距離を有していることにより、一次処理部の底部に堆積する汚泥がそのまま二次処理部に流れ込まないことになる。本発明が対象とする、下水道に直接放流されるような排水は汚泥含有量も少ないことから汚泥に関してはそのまま排出しても問題ないが、一次処理部のすべての汚泥が二次処理部に流れ込むとすると、二次処理部では汚泥の堆積量が著しく増加し高濃度となって、それをそのまま排出することはできなくなり、結局活性汚泥処理方法における余剰汚泥の除去と同様の煩雑な処理が必要となる。すなわち、導水路が槽底部から所定距離を有していることにより、常に適量の汚泥濃度の処理水が二次処理部に流れるものとなり、よって二次処理部では汚泥の処理をしないまま排出することができるものとなる。なお、一次処理部の底部には汚泥が堆積するものの、その堆積量が導水路まで達すれば二次処理部に流れ込み、堆積量は常に一定値以下となるので、それを除去するまでには至らない。

【００１８】次に、導水路が水面から所定距離を有していることにより、一次処理部の水面近傍で行われている油脂分解作用を確保している。すなわち、一次処理部の水面近傍では、油脂分とその分解菌とが超微細気泡によって上昇され、かつ超微細気泡による滞留作用で効率的な分解反応が行われるが、導水路が水面から所定距離を有していることにより、水面近傍では仕切体による閉鎖によって分解反応中の処理水が二次処理部に流入するのを阻止し、滞留作用を確実に行わせて油脂分解作用を確保しているものである。

【００１９】二次処理部に導水された処理水は、そこで散気撹拌される。処理水中には油脂分解菌が混入しているため分解反応が生じる。その一部は前記一次処理部に返送してそこで再度分解処理を行わせる。この繰り返しにより、油脂分の分解効率を格段に向上させるものとなる。

【００２０】二次処理部からの処理水の排出は、槽底部から行う。これは、上述の導水路の作用によって処理水の汚泥濃度が適量となっていることから、その濃度で排出しても汚泥に関しては問題なく、また槽上部から排出するとすると、槽底部に汚泥が堆積してしまい、その堆積した汚泥の除去作業が必要となるので、槽底部から汚泥を含んだまま排出するものとしている。すなわち、本発明では、油脂分解菌の油脂分解作用のみを利用して汚泥を利用しないのみならず、前記導水路の形成構成及び

槽底部からの排出構成によって汚泥処理を一切要さないものとなっている。

【００２１】

【発明の実施の形態】本発明に係る実施の形態を図面に基づき説明する。なお、本発明は以下の形態に何ら限定されるものではない。

【００２２】図１は本発明が適用できる処理設備の一例を示した概略図であり、図中、１は処理槽、２は一次処理部、３は二次処理部、４は仕切体である仕切板、５は導水路、６は超微細気泡用散気管、７は接触材、８は超微細気泡作成装置、９,10はポンプ、11は粗大気泡用散気管である。なお、処理槽１に注入される原水はすでにネット状スクリーン（網目２～５㎜）で濾過しているものとする。

【００２３】処理槽１は、その底部に散気管６,11を配置できればどのような形状，大きさでもよく、例えば従来活性汚泥処理法で用いていた曝気槽なども十分転用可能である。

【００２４】処理槽１は、その中央部において仕切板４が配置され、該仕切板４によって処理槽１は一次処理部２と二次処理部３とに分けられている。

【００２５】一次処理部２の上部には原水が注入される導入管が配置されるとともに、槽底部には散気管６が、また該散気管６の上部に接触材７がそれぞれ配置される。

【００２６】仕切板４は導水路５となる間隙が形成され、その間隙の形成位置は、槽底部及び水面の双方から所定距離を有する中間部となっている。

【００２７】散気管６は、超微細気泡作成装置８からの加圧空気水を散水させる管である。超微細気泡作成装置８は、原水用ポンプ81と、エア取入バルブ82と、加圧タンク83と、加背圧バルブ84とからなり、ポンプ81で処理槽１から汲み上げた原水にバルブ82からエアを取り入れて混合させ、ポンプ81とバルブ84とで加圧タンク83内でエア混合水を加圧させて加圧空気水を作成する。この加圧空気水を前記散気管６に通してやると、処理槽１内では一気に減圧状態となるため、加圧空気水の混合エアがミクロン単位の超微細気泡となって上昇することになる。なお、超微細気泡作成装置８の他の構成としては、エアのみブロアで散気管６から吹き出させるようにすることが考えられる。ただし、その態様では散気管６の孔を超微細に形成する必要があり、その構成としては例えば膨張させたゴムを孔を有した管周囲に被包してなるものなどが考えられる。

【００２８】接触材７は、油脂分解菌をそこに付着させて培養増殖させる場所であり、このため菌の培養に適した材質、例えばセラミック材や軽石、花崗岩などが好ましい。また使用する油脂分解菌は公知のものでよい。

【００２９】二次処理部３は、下部に返送用のポンプ10が配置されるとともに、槽底部に排出用ポンプ９と散気

管11が配置される。

【００３０】二次処理部３の散気管11は、一次処理部２の散気管６と異なり、粗大な気泡を通過させる多数の孔を有した管よりなり、連通管を介してブロア20に接続される。この散気管11から吹き上げられる気泡は粗大となり、二次処理部３内の処理水を十分に撹拌することになる。

【００３１】以上のような簡易な設備構成における処理を次に説明する。

【００３２】原水が注入される一次処理部２内において、油脂分解菌を連続的に投入するとともに、超微細気泡作成装置８から加圧空気水を散気管６に送り、散気管６の微少孔よりミクロン単位の超微細気泡が吹き上がるようにする。原水中の油脂分は、その超微細気泡により効率的に上昇することになる。また超微細気泡は接触材７をも通過するが、予め接触材７には適量の油脂分解菌を付着させており、このためそこで増殖している油脂分解菌の一部も超微細気泡ににより上昇する。油脂分と油脂分解菌は一次処理部２の水面まで上昇するが、上昇する気泡がミクロン単位の超微細なため両者は水面近傍で滞留することになる。この超微細気泡の滞留作用と分解促進作用とが相俟って、水面近傍では油脂分の分解が効率よく行われる。

【００３３】一次処理部２の処理水は、仕切板４の導水路５を介して二次処理部３へと導水される。この導水路５は、槽底部及び水面の双方から所定距離を有して位置する中間部に形成されていることから、まず、一次処理部２の底部に堆積する汚泥がそのまま二次処理部３に流れ込まず、導水路５の高さまで堆積して始めて流出する。したがって、汚泥濃度が常に適量となって二次処理部３へ流れ込むことになる。一次処理部２の槽底部においては、導水路５の高さまでは汚泥が堆積するが、それ以上になれば上述のように処理水とともに流出するので、高濃度で堆積するということがなく、汚泥除去する処理は不要である。次に、導水路５が水面からも所定距離を有していることにより、水面近傍では仕切板４による閉鎖によって分解反応中の処理水が二次処理部３に流入するのを阻止し、超微細気泡による滞留作用を確実に行わせて油脂分解作用を確保させている。

【００３４】二次処理部３では散気管11から粗大気泡が吹き上げられており、この吹き上げによって、導水された処理水が撹拌される。一次処理部２からの処理水には油脂分解菌も含まれており、このため粗大気泡による撹拌によって油脂分の分解をより促進させる。さらに、撹拌水をポンプ10で返送管を介して一次処理部２に返送し、再度一次処理部２内で油脂分の分解処理を行う。このような処理を行った後、二次処理部３の槽底部からポンプ９により処理水を汲み上げ、下水道に放流する。槽底部の処理水の排出を行うことに関しては、前記導水路５の作用によって処理水の汚泥濃度が適量となっている

ことからそれを排出しても問題がないばかりでなく、二次処理部３の槽底部に汚泥が堆積するのを防ぎ、煩雑な汚泥除去作業を不要としている。

【００３５】このように本実施形態では、汚泥濃度を低く維持させ、槽底部に汚泥を必要以上に堆積させないため、汚泥処理を一切要しない極めて簡易な設備構成ながら、原水中の油脂分を効率よく分解させることができるものとなっており、後述する実施例に示すように、排水を下水道に直接放水するような施設の排水処理規制に十分適用できるものとなっている。

【００３６】

【実施例】前記実施形態の設備構成において、次のような施設仕様により排水の試験を行った。

処理槽：150㎥，加圧タンク：３～７Kg/㎠Ｇ，ブロア：2.2㎥/min，ポンプ：150l/min

また、処理水の規準は、次の保証水質を規準とした。

ｐＨ　　：　５～９

ＢＯＤ　　：600mg/l以下

＊ＳＳ　　：600mg/l以下

Ｎ－Hex抽出物質　：　30mg/l以下

【００３７】◎第１試験例：食堂施設に付設されるグリーストラップ槽（油水分離のための貯水槽で、油分は上面に浮上した後底部に沈み堆積する）から油分を含めて抽出した厨房排水を用いた。水質は、ｐＨ：6.9，ＣＯＤ：7800mg/l，Ｎ－Hex抽出物質：40300mg/l（通常の厨房排水では100～200mg/l）であり、これを約100倍に希釈して調整した（Ｎ－Hex抽出物質：400mg/l）。処理槽１への、油脂分解菌の添加量は製剤よりなるものを0.035g/l、菌栄養剤は0.3g/lであった。このような処理槽１に、前記調整した試験試料20ｌを注入して処理を行った。この試験結果を表１（Ｎ－Hex値のみ図２のグラフに示す）に示す。なお、表１中の単位は、ｐＨ以外はすべてmg/lである。

【００３８】

【表１】

＊

経過時間	ＤＯ	ｐＨ（28℃）	Ｎ－Hex抽出物質
０時間後	－	8.0	415
６時間後	6.9	7.0	253
１２時間後	7.5	7.0	31
２４時間後	8.0	7.0	8
４８時間後	8.0	7.0	3

【００３９】上記表１より明らかなように、１２時間経過後にＮ－Hex値が許容最大規準値とほぼ同程度となり、２４時間以内に許容規準値（東京都）となった。４８時間経過後は３mg/lとその濃度が極端に減少した。

【００４０】◎第２試験例：東京大井町にある百貨店内レストラン及び社員食堂のそれぞれの排水を、７：３の比率で混合したものを試料として用いた。水質は、表２の通りである。表２の水質中、ｐＨ値のみその値が低かったので7.1に調整した。処理槽１への、油脂分解菌の添加量は製剤よりなるものを0.035g/l、菌栄養剤は0.3g/lであった。このような処理槽１に、前記調整した試験試料20ｌを注入して処理を行った。この試験結果を表３（Ｎ－Hex値のみ図３のグラフに示す）に示す。なお、表２及び表３中の単位は、ｐＨ以外はすべてmg/lである。

【００４１】

【表２】

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	レストラン	社員食堂	混合排水（試料）
ｐＨ	6.4	5.9	6.2（実測値）
ＳＳ	160	260	190（計算値）
ＢＯＤ	430	570	472（計算値）
N-Hex抽出物質	47	97	62（計算値）

【００４２】
【表３】

経過時間	１２時間	２４時間
ｐＨ	7.0	6.8
ＳＳ	215	220
ＢＯＤ	495	470
N-Hex抽出物質	27	4

【００４３】上記表３より明らかなように、１２時間経過後にＮ－Hex値が許容規準値内（東京都）となり、２４時間経過後では４mg/lとその濃度が極端に減少した。なお、ＢＯＤ値は１２時間経過後に当初の数値よりやや上回ったものの、それでも規準値600mg/lより大幅に低く、またＳＳ値も２４時間経過後ではやや上昇したがこれも規準値600mg/lより大幅に低いものとなっている。

【００４４】また、同一条件の試験を、平成７年５月30日から９月29日の期間内のうち任意の６日間を選択して、その選択した日の午後12時における原水と処理水とのＮ－Hex値を調べた結果、Ｎ－Hex値除去率は最高で85％（６月29日）、最低でも45％（５月30日）であり、平均で約72％と極めて効果的な除去率が認められた。

【００４５】

【発明の効果】以上説明したように、本発明に係る下水道放水用排水処理方法によれば、油脂分のみ規準値以上である下水道放水用排水の性質に最適な処理が、極めて簡易な装置構成で行えることになる。

【００４６】すなわち、次のような効果が得られるものとなる。

①処理に要する設備は、基本的に１の処理槽内を２に分ければ足りるので、従来の活性汚泥処理方法のように、調整槽、曝気槽、沈殿槽、汚泥処理・廃棄設備等多数の構成を揃える必要がなく、またその前処理工程の凝集・加圧分離処理と比較しても、凝集に用いる中和剤、凝集剤の選定や調整作業のための専門担当者をおく必要もなく、浮上したスカムの掻取作業及び貯留作業やそれを脱水したりさらに廃棄する作業及び設備も不要である。すなわち、本発明法では従来方法と比べて極めて簡易な装置構成で足り、このため設置及び稼動コストも格段に減少するものとなっている（同一規模で概算すると、設備コストが1/4、稼動コストが1/7程度減少すると推測される）。

②工程としても、活性汚泥処理方法のように、多くの処理を必要とせず、特に煩雑な汚泥処理（汚泥量の調整、余剰汚泥の処理・除去等）が一切不要であって設備のメンテナンスも容易になっている。

③超微細気泡を吹き上げられる工程によって、油脂分を水面近傍に上昇かつ滞留させ、これにより、水面近傍で油脂分解菌との分解反応を促進させるものであるため、その処理効率の向上が顕著に行われる。よって、油脂分のみ規準値以上である下水道放水用排水の処理に最適な処理方法となっている。

④もちろん、従来の簡易処理法であったグリーストラップ処理と比較しても、それに要する掻取・廃棄作業及び設備は不要であって、簡易な構成となるものであり、しかも、単に油水分離槽で油脂分を除去するのと異なって、本発明では油脂分を分解して除去するので、油脂分減少効率は格段に向上する。

⑤また処理槽内には、基本的に所定の仕切体を配するとともに、超微細気泡の吹き上げ手段と攪拌手段を設ければ足りることからその設置も容易であり、また従来使用していた曝気槽や沈殿槽を転用することも簡単に行えるというメリットも有している。

【図面の簡単な説明】

【図１】本発明の実施形態に係る処理設備の概略を示した説明図である。

【図２】第１試験例のＮ－Hex抽出物質値の推移を示したグラフである。

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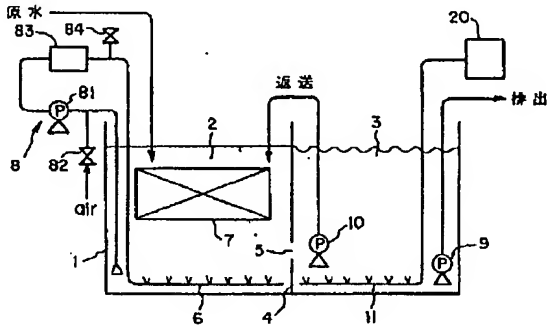
【図３】第２試験例のＮ－Hex抽出物質値の推移を示したグラフである。

【図４】活性汚泥処理方法に要する処理設備の概略を示した説明図である。

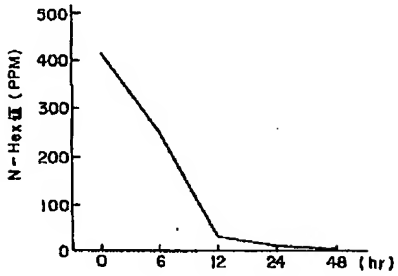
【符号の説明】

1　処理槽
2　一次処理部
＊3　二次処理部
4　仕切板
5　導水路
6　超微細気泡用散気管
8　超微細気泡作成装置
11　粗大気泡用散気管

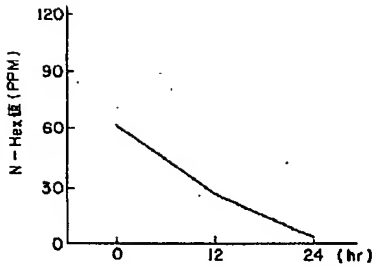
【図１】



【図２】



【図３】



【図４】